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## THE CHANGE IN THE PROPORTION OF CHILDREN IN THE UNITED STATES AND IN THE BIRTH RATE IN FRANCE DURING THE NINETEENTH CENTURY.

BY WALTER F. WILLCOX.

The object of this paper is to determine approximately the changes in the birth rates of the United States during the nineteenth century and to compare those changes in direction and amount with the changes which went on in France during the same period.

In European countries as a class the steady and rapid decrease of the birth rate is a comparatively recent fact. If one considers the average birth rate for each ten years of the century or of so much of the century as is covered by the records, the maximum rate is found to have been reached in France as early as 1811-20, in Norway, Sweden, Finland, Austria and Prussia in 1821-30, in Belgium in 1831-40, in Denmark in 1851-60, in Scotland and Spain in 1861-70, in England and Wales, Ireland, Hungary, Switzerland, Germany, Bavaria, Saxony and the Netherlands in 1871-80, in Portugal, Italy, Servia and Roumania in 1881-90. In 16 of the 22 countries named the lowest birth rate was for the last decade of the century.\*

The usual opinion of American students, I believe, is that the decline of the American birth rate, about which so much is written and so little known, is likewise a comparatively recent fact. In the valuable paper by Dr. J. S. Billings† the statistical argument was confined to the decade between 1880 and 1890, but the more general discussion with which he concluded shows at various points that he conceived the change to have set in thirty to forty years earlier, or about the middle of the nineteenth century. This conviction has furnished an important support to the argument that the decrease of the American birth rate, starting when foreign immigrants first

\* *Statistique Internationale du Mouvement de la Population*, Paris, 1907, p. 141.

† "The Diminishing Birth Rate in the United States," *Forum*, June, 1893.

became a powerful influence and manifest where and only where those immigrants settled, was caused by immigration and resulted in little more than a replacement of the earlier by the later stocks.

The belief that the decrease of the American birth rate began not earlier than the middle of the nineteenth century finds support in some conclusions from the figures of the Twelfth Census. In the passage referred to below\* I showed that the proportion of children under 5 years of age to each 1,000 women between 15 and 49 years of age during the last half of the century, for which alone the figures were to be had, changed as follows:

Date.	Living children under 5 years old to 1,000 women 15 to 49 years old.
1850	626
1860	634
1870	572
1880	559
1890	485
1900	474

This evidence clearly supported the prevailing opinion and led me to the belief that the decrease of the American birth rate began at about the time of the Civil War. I now think this inference was unwarranted and that the decrease began as early as 1810.

The preceding table can be carried back for earlier census years by means of estimates. But for that process it seems wiser to assume the years of child bearing as 16 to 44 instead of 15 to 49, because in 1800, 1810, and 1820 the white women 16 to 44 were reported by the census and estimates are needed only for the colored.

*Estimated number of women 16 to 44 years of age.*

1900, 1890 and 1880 no estimates required.

1870—women between 18 and 44 given in the tables;

\* Twelfth Census: Supplementary Analysis and Derivative Tables, p. 409, ff.

women 16 or 17 estimated by assuming (a) that the white women 16 or 17 bore to the reported number 15 to 17 in 1870 the same proportion (68.1 per cent.) that they did in 1880; (b) that the colored women 16 or 17 bore to the reported number 15 to 17 in 1870 the same proportion (65.65 per cent.) that they did in 1880. By this method 90.1 per cent. of the total number of women was obtained by enumeration and any error in the estimate would be reduced to one-tenth in its effect on the total.

The following table shows the estimated number of women 16 to 44 years of age at each census between 1800 and 1900 with the proportion derived from estimate.

Date.	Women 16 to 44 years of age.	Per cent.	
		Enumerated.	Estimated.
1900.....	16,985,694	100	0
1890.....	13,784,592	100	0
1880.....	10,896,564	100	0
1870.....	8,497,402	90.1	9.9
1860.....	6,773,106	69.6	30.4
1850.....	5,004,665	68.3	31.7
1840.....	3,567,690	64.9	35.1
1830.....	2,637,838	64.1	35.9
1820.....	1,888,088	89.9	10.1
1810.....	1,396,007	79.7	20.3
1800.....	1,023,554	79.9	20.1

It will be noticed that the largest proportion (35.9 per cent.) was determined by estimates in 1830 and that for earlier dates, notably 1800, 1810 and 1820, the margin of probable error is much less. This is important because it is the general trend rather than the figures for any single year that is important.

*Estimated number of children under 5 years of age.*

The following table shows in like fashion the number of children under 5 years of age enumerated or estimated for each census.

Date.	Children under five years of age.	Per cent.	
		Enumerated.	Estimated.
1900.....	9,189,448	100	0
1890.....	7,634,693	100	0
1880.....	6,914,516	100	0
1870.....	5,514,713	100	0
1860.....	4,836,579	100	0
1850.....	3,497,773	100	0
1840.....	2,978,838	81.3	18.7
1830.....	2,313,576	81.8	18.2
1820.....	1,752,740	0	100
1810.....	1,362,459	0	100
1800.....	998,690	0	100

The question arises, How is it possible to estimate the total number of children under 5 years of age in 1800, 1810, or 1820 with any approach to accuracy? The census gives for each of these dates the number of white children under 10 years of age with distinction of sex, and the problem is to determine what proportion of these children were under 5 years of age. From the censuses after 1820 the following per cents. may be computed.

Date.	Per cent. that white children under 5 years made of those under 10 years of age.	
	Male.	Female.
1830.....	55.4	55.0
1840.....	55.4	55.0
1850.....	51.8	51.7
1860.....	53.9	53.8
1870.....	53.3	53.1
1800.....	51.7	51.5
1890.....	50.6	50.3
1900.....	51.0	50.9

The table warrants the assumption that the male white children under 5 in 1800, 1810, and 1820 were about 55.4 per cent. and the female white children under 5 about 55.0 per cent. of those of the same sex under 10 at the specified date.

For the slaves and free colored population in 1820 there is a classification by sex and into four age periods, the lowest of which is under 14. Of those enumerated as under 14 the number under 10 of each sex was estimated according to the percentages in 1880. Of these estimated numbers under 10 the numbers under 5 for each sex were estimated according to the percentages in 1850.

The problem of estimating the slave and free colored population under 5 years of age in 1810 was even more complicated. Only the total of both sexes and all ages is given. The number of males and females was estimated by assuming that the proportions of the sexes were the same as in 1820. From these the numbers under 10 of each sex were derived by assuming the proportions found in 1830. From these again the numbers under 5 of each sex were estimated by assuming the proportions prevailing in 1850. Notwithstanding the numerous assumptions on which these estimates must be based, all that is known about the persistence of sex proportions and age proportions through short periods of time warrants the conclusion that the results are accurate enough to be better than complete ignorance and to be accepted as indicating the trend of change.

Another and perhaps a more accurate method for estimating the women between 16 and 44 has been tried and gives results smaller by some 3 to 4 per cent. As acceptance of these results would be favorable to my argument, I have rejected them. I believe that the proportions stated in the following table for the earlier censuses are probably below rather than above the truth and that the actual decline in the birth rate was slightly greater than the apparent decline.

Proportion of children under 5 to 1,000 women 16-44.

Date.	Number women 16-44.	Number children under 5.	Number children to 1,000 women.
1900.....	16,985,694	9,189,448	541
1890.....	13,784,592	7,634,693	554
1880.....	10,896,564	6,914,516	635
1870.....	8,497,402*	5,514,713	649*
1860.....	6,773,106*	4,836,579	714*
1850.....	5,004,665*	3,497,773	699*
1840.....	3,567,690*	2,978,838*	835*
1830.....	2,637,838*	2,313,576*	877*
1820.....	1,888,088*	1,752,740*	928*
1810.....	1,396,007*	1,362,459*	976*
1800.....	1,023,554*	998,690*	976*

\*Estimated.

The preceding table shows that the proportion of children to women of child-bearing age and so probably the birth rate in the United States was not stationary or increasing prior to 1860 as has usually been supposed and as the figures for 1850-1860 taken alone would indicate. On the contrary that decade was probably the only one during the entire century marked by an increasing birth rate and the rapidity of the decline between 1810 and 1840 was about the same as that between 1860 and 1900. The abnormal decrease between 1840 and 1850 in the proportion of children is probably due in the main to the arrival of many immigrant women during that decade especially from Ireland and Germany, and the lack of a proportionate number of births or perhaps the high rate of mortality among children born between 1845 and 1850. The increase of this proportion between 1850 and 1860 may be ascribed to the greater fecundity among these immigrant women or the lower mortality of their children in the following decade. Since 1840 decades of very great immigration (1840-50 and 1880-90) or of war (1860-70) have been characterized by an excessive decline in the proportion of children and the decades immediately following by a return towards the normal proportion. The main conclusion that the decrease in the proportion of children began in the United States as early

as 1810 and has continued at about the same rate ever since is clearly established by the evidence.

France is the only European country in which the birth rate is known to have attained its maximum so early in the century and to have declined steadily ever since. As the French figures show the rates of births each year to the total population and the American figures the rates of living children under 5 years of age to 1,000 women 16 to 44 years of age, they cannot be directly compared. To reduce them to a common denominator the following method has been used.

(1) The average birth rate in France has been found for each five-year period ending with the year in which an American census was taken, viz., 1806–10, 1816–20, etc.

(2) The resulting series has been expressed as ratios of the birth rate 1896–1900 taken as 100 per cent.

(3) The series showing the proportion of children to women in the United States at each census since 1810 has been expressed similarly as ratios of the proportion in 1900 taken as 100 per cent.

(4) The proportion of children under five years of age to 1,000 women 16 to 44 years of age in the United States in 1900 being 541 and in France in 1901 being 425,\* 441 has been added to each number in the American series and 325 to each number in the French series.

The results of this computation are given in the following table:

\* To find this proportion the number of women 15 years old in France has been estimated and subtracted from the number 15–44 years of age.

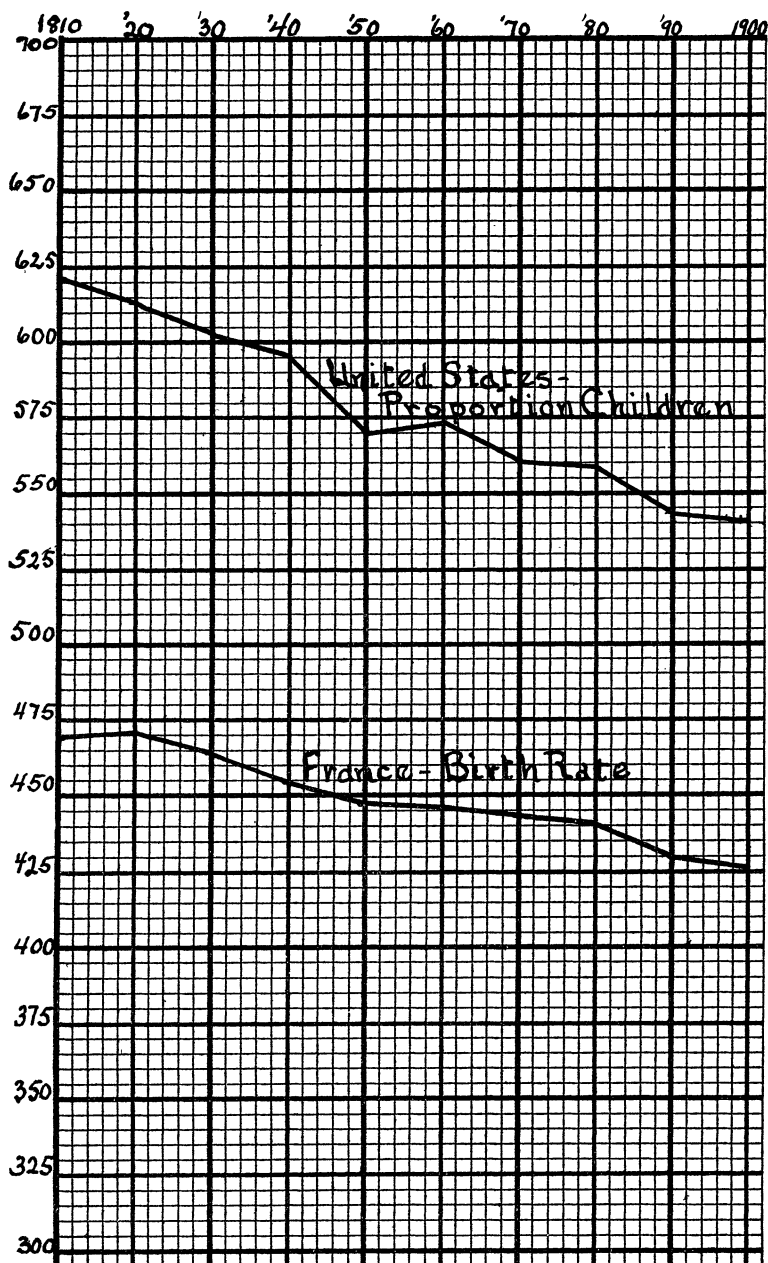


Date.	Average birth rate per 1,000 population for preceding 5 years.	Proportion of children under 5 years of age to 1000 women 16 to 44 years of age.	Ratio of numbers for preceding years to those for 1900 = 100 per cent.		Ratios increased—	
			France.	United States.	By 325 for France.	By 441 for United States.
1900	22.0	541	100.0	100.0	425	541
1890	23.1	554	104.9	102.4	430	543
1880	25.3	635	115.2	117.4	440	558
1870	25.9	649	118.0	120.0	443	561
1860	26.6	714	121.0	132.0	446	573
1850	26.7	699	121.7	129.2	447	570
1840	28.4	835	129.0	154.3	454	595
1830	30.5	877	138.8	162.1	464	603
1820	32.0	928	145.5	171.5	471	613
1810	31.7	976	144.0	180.4	469	621

The preceding table suggests that the proportion of children in the United States has uniformly been greater than in France, but that the difference between the two countries has been a decreasing one. The average French birth rate 1896–1900 was 69.4 per cent. of the rate 1806–1810; the American proportion of children in 1900 was only 55.4 per cent. of what it was in 1810.

The last two columns may be expressed in the form of a diagram.

PROPORTION OF CHILDREN IN UNITED STATES AND BIRTH RATE  
IN FRANCE 1810-1900 COMPARED.



The diagram illustrates what the figures clearly reveal, that the birth rate in the United States is and has been much higher than in France but that its decrease for nearly a century has been almost as regular and much more rapid. There is no indication in either country that the rate of decrease is becoming less rapid and so the lines of the diagram tending to become more nearly parallel to the base. No doubt that will be the ultimate change, but for the ninety years covered both lines have been approximately straight. It is easy to compute when either line would meet the base if its direction remained unchanged, but such a computation would have value not as a prediction but only as a graphic way of stating the magnitude of past changes.